WHAT IS CLAIMED IS:

1. A tunable laser comprising:

a gain means with an active emission section which generates optical energy;

a first and a second aligned asynchronous waveguides extending from the gain means, the first waveguide having a first end adjacent to the active emission section for receiving the optical energy generated by the active emission section;

a substrate supporting the first waveguide, the second waveguide, and the gain means;

an optical coupler positioned to provide optical coupling between the first and the second waveguides at a coupling wavelength where the first and the second waveguides are substantially transparent to the optical energy at the coupling wavelength;

a reflector positioned to reflect the optical energy propagating along the second waveguide if the optical energy has a wavelength that is one of a plurality of reflection wavelengths;

thermo-optical organic material having an index of refraction that varies in response to changes in temperature and positioned to shift the coupling wavelength in response to changes of temperature in the thermo-optical organic material; and

means for changing the temperature in the thermo-optical organic material positioned to shift the coupling wavelength.

2. The tunable laser of claim 1 further comprising thermo-optical organic material positioned to shift the plurality of reflection wavelengths and means for changing the temperature in the thermo-optical organic material positioned to shift the plurality of reflection wavelengths.

3. The tunable laser of claim 2 wherein the second waveguide includes a grating-free portion interposed between the optical coupler and the reflector, the grating-free portion including a phase control section.

4. The tunable laser of claim 3 further comprising thermo-optical organic material positioned in proximity to the phase control section and means for changing the temperature in the thermo-optical organic material positioned in proximity to the phase control section.

5. The tunable laser of claim 4 wherein the thermo-optical organic material has a coefficient of refractive index variation as a function of temperature, the magnitude of which exceeds $1 \times 10^{-4}/^{\circ}C$.

6. The tunable laser of claim 4 wherein the thermo-optical organic material is selected from the group comprising a polymer derived from methacrylate, a polymer derived from siloxane, a polymer derived from carbonate, a polymer derived from styrene, a polymer derived from cyclic olefin, and a polymer derived from norbornene.

7. The tunable laser of claim 1 wherein the optical coupling means comprises longitudinally periodic grooves formed on a surface of the first waveguide.

8. The tunable laser of claim 1 wherein the optical coupler is selected from the group comprising a co-directional grating assisted coupler and a reflective grating assisted coupler.

9. The tunable laser of claim 4 wherein the means for changing the temperature in the thermo-optical organic material is selected from the group comprising a resistive heater, a thermoelectric heater, and a thermoelectric cooler.

10. An integrated optical component comprising:

a substrate supporting a first and a second aligned asynchronous waveguides;

an optical coupler positioned to provide optical coupling between the first and the second waveguides at a coupling wavelength where the first and the second waveguides are substantially transparent to optical energy at the coupling wavelength;

a reflector positioned to reflect optical energy propagating along the second waveguide if the optical energy has a wavelength that is one of a plurality of reflection wavelengths;

thermo-optical organic material having an index of refraction that varies in response to changes in temperature and positioned to shift the coupling wavelength in response

to changes of temperature in the thermo-optical organic material; and

means for changing the temperature in the thermo-optical organic material positioned to shift the coupling wavelength.

11. The integrated optical component of claim 10 further comprising thermo-optical organic material positioned to shift the plurality of reflection wavelengths and means for changing the temperature in the thermo-optical organic material positioned to shift the plurality of reflection wavelengths.

12. The integrated optical component of claim 11 wherein the second waveguide includes a grating-free portion interposed between the optical coupler and the reflector, the grating-free portion including a phase control section.

13. The integrated optical component of claim 12 further comprising thermo-optical organic material positioned in proximity to the phase control section and means for changing the temperature in the thermo-optical organic material positioned in proximity to the phase control section.

14. The integrated optical component of claim 13 wherein the thermo-optical organic material has a coefficient of refractive index variation as a function of temperature, the magnitude of which exceeds $1 \times 10^{-4}/^{\circ}C$.

15. The integrated optical component of claim 13 wherein the thermo-optical organic material is selected from the group comprising a polymer derived from methacrylate, a polymer derived from siloxane, a polymer derived from carbonate, a polymer derived from styrene, a polymer derived from cyclic olefin, and a polymer derived from norbornene.

16. The integrated optical component of claim 10 wherein the optical coupling means comprises longitudinally periodic grooves formed on a surface of the first waveguide.

17. The integrated optical component of claim 10 wherein the optical coupler is selected from the group comprising of a co-directional grating assisted coupler and a reflective grating assisted coupler.

18. The integrated optical component of claim 13 wherein the means for changing the temperature in the thermo-optical organic material is selected from the group comprising a resistive heater, a thermoelectric heater, and a thermoelectric cooler.

19. The integrated optical component of claim 10 further comprising a gain means with an active emission section which generates optical energy, the first waveguide having a first end adjacent to the active emission section for receiving the optical energy generated by the active emission section.

20. An optical coupler comprising:

a substrate supporting a first and a second aligned asynchronous waveguides, the first and the second aligned asynchronous waveguides having a first and a second end;

optical coupling means positioned to provide optical coupling between the first and the second waveguides at a coupling wavelength where the first and the second waveguides are substantially transparent to the optical energy at the coupling wavelength;

thermo-optical organic material having an index of refraction that varies in response to changes in temperature and positioned to shift the coupling wavelength in response to changes of temperature in the thermo-optical organic material;

means for changing the temperature in the thermo-optical organic material positioned to shift the coupling wavelength;

the first end of the first waveguide being terminated to pass optical energy and the second end of the first waveguide being terminated to prevent optical energy not coupled to the second waveguide by the optical coupling means from re-entering the first waveguide; and

the first end of the second waveguide being terminated to prevent optical energy not coupled to the first waveguide by the optical coupling means from reflecting back along the second.

21. The optical coupler of claim 20 wherein the thermo-optical organic material has a coefficient of refractive index variation as a function of temperature, the magnitude of which exceeds $1 \times 10^{-4}/°C$.

22. The optical coupler of claim 20 wherein the thermo-optical organic material is selected from the group comprising a polymer derived from methacrylate, a polymer derived from siloxane, a polymer derived from carbonate, a polymer derived from styrene, a polymer derived from cyclic olefin, and a polymer derived from norbornene.

23. The optical coupler of claim 20 wherein the optical coupling means comprises longitudinally periodic grooves formed on a surface of the first waveguide.

24. The optical coupler of claim 23 wherein the longitudinally periodic refractive grooves have a period which is in the range of 1 - 50 μm.

25. The optical coupler of claim 20 wherein the optical coupling means is selected from the group comprising a co-directional grating assisted coupler and a reflective grating assisted coupler.

26. The optical coupler of claim 20 wherein the means for changing the temperature in the thermo-optical organic material is selected from the group comprising a resistive heater, a thermoelectric heater, and a thermoelectric cooler.

27. A tunable laser comprising:

a gain means with an active emission section which generates optical energy, the active emission section having a first and a second facet;

a substrate supporting the gain means and a first and a second aligned asynchronous waveguides, the first and the second aligned asynchronous waveguides having a first and a second end;

optical coupling means positioned to provide optical coupling between the first and the second waveguides at a coupling wavelength where the first and the second waveguides are substantially transparent to the optical energy at the coupling wavelength;

thermo-optical organic material having an index of refraction that varies in response to changes in temperature and positioned to shift the coupling wavelength in response to changes of temperature in the thermo-optical organic material;

means for changing the temperature in the thermo-optical organic material positioned to shift the coupling wavelength;

the first end of the first waveguide being adjacent to the first facet of the active emission section and the second end of the first waveguide being terminated to prevent optical energy not coupled to the second waveguide by the optical coupling means from re-entering the first waveguide; and

the first end of the second waveguide being terminated to prevent optical energy not coupled to the first waveguide by the optical coupling means from reflecting back along the second waveguide.

28. The tunable laser of claim 27 wherein the second end of the second waveguide is terminated to reflect optical energy back along the second waveguide.

29. The tunable laser of claim 28 further comprising:

a third waveguide supported by the substrate and having a first and a second end, the first end of the third waveguide adjacent to the second end of the active emission section, the second end being terminated to prevent optical energy from reflecting back along the third waveguide;

a reflector positioned to reflect optical energy propagating along the third waveguide if the optical energy has a wavelength that is one of a plurality of reflected wavelengths;

thermo-optical organic material positioned to shift the plurality of reflection wavelengths; and

means for changing the temperature of the thermo-optical organic material positioned to shift the plurality of reflection wavelengths.

30. The tunable laser of claim 29 wherein the thermo-optical organic material has a coefficient of refractive index variation as a function of temperature, the magnitude of which exceeds 1 x 10^{-4}/°C.

31. The tunable laser of claim 29 wherein the thermo-optical organic material is selected from a group comprising a polymer derived from methacrylate, a polymer derived from siloxane, a polymer derived from carbonate, a polymer derived from styrene, a polymer derived from cyclic olefin, and a polymer derived from norbornene.

32. The tunable laser of claim 29 wherein the optical coupling means comprises longitudinally periodic grooves formed on a surface of the first waveguide.

33. The tunable laser of claim 32 wherein the longitudinally periodic refractive grooves have a period which is in the range of 1 - 50 μm.

34. The tunable laser of claim 27 wherein the optical coupling means is selected from the group comprising of a co-directional grating assisted coupler and a reflective grating assisted coupler.

35. The tunable laser of claim 27 wherein the means for changing the temperature in the thermo-optical organic material is selected from the group comprising a resistive heater, a thermoelectric heater, and a thermoelectric cooler.

36. A tunable laser comprising:

a gain means with an active emission section which generates optical energy;

a first and a second aligned asynchronous waveguides extending from the gain means, the first waveguide having a first end adjacent to the active emission section for receiving the optical energy generated by the active emission section;

a substrate supporting the first waveguide, the second waveguide, and the gain means;

a reflective grating assisted coupler providing reflective optical coupling between the first and the second

waveguides at a coupling wavelength where the first and the second waveguides are substantially transparent to the optical energy at the coupling wavelength; and

a reflector positioned to reflect the optical energy on the second waveguide if the optical energy has a wavelength that is one of a plurality of reflection wavelengths.

37. The tunable laser of claim 36 further comprising means to inject current into the first waveguide and the second waveguide.

38. The tunable laser of claim 36 further comprising:

thermo-optical organic material having an index of refraction that varies in response to changes in temperature and positioned to shift the coupling wavelength in response to changes of temperature in the thermo-optical organic material; and

means for changing the temperature in the thermo-optical organic material positioned to shift the coupling wavelength.

39. The tunable laser of claim 38 further comprising thermo-optical organic material positioned to shift the plurality of reflection wavelengths and means for changing the temperature in the thermo-optical organic material positioned to shift the plurality of reflection wavelengths.

40. The tunable laser of claim 39 wherein the second waveguide includes a grating-free portion interposed between the reflective grating assisted coupler and the reflector, the grating-free portion including a phase control section.

41. The tunable laser of claim 40 further comprising thermo-optical organic material positioned in proximity to the phase control section and means for changing the temperature in the thermo-optical organic material positioned in proximity to the phase control section.

42. The tunable laser of claim 41 wherein the thermo-optical organic material has a coefficient of refractive index variation as a function of temperature, the magnitude of which exceeds $1 \times 10^{-4}/^{o}C$.

43. The tunable laser of claim 41 wherein the thermo-optical organic material is selected from the group comprising a polymer derived from methacrylate, a polymer derived from siloxane, a polymer derived from carbonate, a polymer derived from styrene, a polymer derived from cyclic olefin, an a polymer derived from norbornene.

44. An integrated optical component comprising:

a substrate supporting a first and a second aligned asynchronous waveguides;

a reflective grating assisted coupler providing reflective optical coupling between the first and the second waveguides at a coupling wavelength where the first and the second waveguides are substantially transparent to the optical energy at the coupling wavelength; and

a reflector positioned to reflect the optical energy on the second waveguide if the optical energy has a wavelength that is one of a plurality of reflection wavelengths.

45. The integrated optical component of claim 44 further comprising means to inject current into the first waveguide and the second waveguide.

46. The integrated optical component of claim 44 further comprising:

thermo-optical organic material having an index of refraction that varies in response to changes in temperature and positioned to shift the coupling wavelength in response to changes of temperature in the thermo-optical organic material; and

means for changing the temperature in the thermo-optical organic material positioned to shift the coupling wavelength.

47. The integrated optical component of claim 44 further comprising a gain means with an active emission section which generates optical energy, the first waveguide having a first end adjacent to the active emission section for receiving the optical energy generated by the active emission section.

48. The integrated optical component of claim 44 further comprising thermo-optical organic material positioned to shift the plurality of reflection wavelengths and means for changing the temperature in the thermo-optical organic material positioned to shift the plurality of reflection wavelengths.

49. The integrated optical component of claim 48 wherein the second waveguide includes a grating-free portion

interposed between the reflective grating assisted coupler and the reflector, the grating-free portion including a phase control section.

50. The integrated optical component of claim 49 further comprising thermo-optical organic material positioned in proximity to the phase control section and means for changing the temperature in the thermo-optical organic material positioned in proximity to the phase control section.

51. The integrated optical component of claim 50 wherein the thermo-optical organic material has a coefficient of refractive index variation as a function of temperature, the magnitude of which exceeds $1 \times 10^{-4}/^{\circ}C$.

52. The integrated optical component of claim 50 wherein the thermo-optical organic material is selected from a group comprising a polymer derived from methacrylate, a polymer derived from siloxane, a polymer derived from carbonate, a polymer derived from styrene, a polymer derived from cyclic olefin, and a polymer derived from norbornene.

53. The integrated optical component of claim 44 wherein the plurality of reflective wavelengths has a first regular spacing, and the reflective grating assisted coupler provides reflective optical coupling between the first and the second waveguides at a plurality of coupling wavelengths with a second regular spacing slightly different from the first regular spacing.

54. An integrated tunable optical filter comprising:

a substrate made of a semiconductor material;

a first section on the substrate forming a transmission filter having a low spectral selectivity, the first section including a first waveguide system with a first and a second waveguide, a periodic rib shaped structure adjacent at least one of the waveguides defining a filter response with a coupling wavelength, and thermo-optical organic material having an index of refraction that varies in response to changes in temperature and positioned to shift the coupling wavelength in response to changes of temperature in the thermo-optical organic material positioned to shift the coupling wavelength;

a second section on the substrate forming a reflector with a spectral reflection with a plurality of reflection peaks, the second section including a third waveguide coupled to the first waveguide system in the first section, and thermo-optical organic material having an index of refraction that varies in response to changes in temperature and positioned to shift the plurality of reflection peaks in response to changes in temperature in the thermo-optical organic material positioned to shift the plurality of reflection peaks;

first means for changing the temperature in the first thermo-optical organic material, the filter response of the first section being shifted in wavelength over a range covering a plurality of reflection peaks in the second section; and

second means for changing the temperature in the second thermo-optical organic material, the reflection spectrum of the second section being shifted in wavelength and one

reflection peak of the plurality of reflection peaks corresponding to the coupling wavelength of the first section;

wherein the optical filter has a reflection response with a narrow bandwidth and wide tunability.

55. The integrated tunable optical filter of claim 54 wherein the first and the second thermo-optical organic material has a coefficient of refractive index variation as a function of temperature, the magnitude of which exceeds 1 x $10^{-4}/^{\circ}C$.

56. The integrated tunable optical filter of claim 54 wherein the thermo-optical organic material is selected from the group comprising a polymer derived from methacrylate, a polymer derived from siloxane, a polymer derived from carbonate, a polymer derived from styrene, a polymer derived from cyclic olefin, and a polymer derived from norbornene.

57. The integrated tunable optical filter of claim 54 wherein the transmission filter is selected from the group comprising of a co-directional grating assisted coupler and a reflective grating assisted coupler.

58. The integrated tunable optical filter of claim 54 wherein the means for changing the temperature in the first and the second thermo-optical organic material is selected from the group comprising a resistive heater, a thermoelectric heater, and a thermoelectric cooler.

59. The tunable laser of claim 36 wherein the reflective grating assisted coupler provides reflective optical coupling between the first and the second waveguides at a plurality of coupling wavelengths where the first and the second waveguides are substantially transparent to the optical energy at each of the coupling wavelength.

60. The integrated optical component of claim 44 wherein the reflective grating provides reflective optical coupling between the first and the second waveguides at a coupling wavelength where the first and the second waveguides are substantially transparent to the optical energy at the coupling wavelength.